

CLAIMS

We claim:

- 1 1. An apparatus for communicating radio frequency (RF) informational signals
2 having a RF power level, through an optical link medium, said apparatus
3 comprising:
4 a first conductor adapted to carry said informational signals as electrical signals
5 into the apparatus;
6 a RF level sensor operatively coupled to the first conductor, adapted to measure
7 the RF power level and to output a control signal according to said RF power level;
8 a first RF attenuator adapted to be operatively controlled by the control signal, and
9 adapted to attenuate the electrical signals from the first conductor prior to being
10 communicated through said optical link medium;
11 a transmitter adapted to transmit the electrical signals as optical signals into the
12 optical link medium;
13 a receiver adapted to receive the optical signals from the optical link medium,
14 said receiver being operatively coupled to a second conductor adapted to carry said
15 informational signals as electrical signals out of the apparatus.
- 1 2. The apparatus of claim 1 further comprising a first RF amplifier adapted to be
2 operatively controlled by the control signal, and adapted to amplify the electrical signals
3 from the first conductor prior to being communicated through said optical link medium.

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1 3. The apparatus of claim 2 wherein the control signal is communicated through said
2 optical link medium, and further comprising a second RF attenuator operatively coupled
3 to the receiver and adapted to be operatively controlled by the encoded control signal, and
4 adapted to attenuate the electrical signals on said second conductor.

1 4. The apparatus of claim 3 wherein the second RF attenuator is adapted to attenuate
2 the electrical signals on said second conductor to within ± 0.5 dB of the RF power level.

1 5. The apparatus of claim 3 wherein the second RF attenuator is adapted to attenuate
2 the electrical signals on said second conductor to approximately the RF power level.

1 6. The apparatus of claim 2 wherein the control signal is communicated through said
2 optical link medium, and further comprising a second RF attenuator operatively coupled
3 to the receiver and adapted to be operatively controlled by the encoded control signal, and
4 adapted to attenuate the electrical signals on said second conductor, and further
5 comprising a second RF amplifier operatively coupled to the receiver and adapted to be
6 operatively controlled by the control signal, and adapted to amplify the electrical signals
7 on said second conductor.

1 7. The apparatus of claim 1 wherein the control signal is communicated through said
2 optical link medium, and further comprising a second RF amplifier operatively coupled to

1 10. An apparatus for enhancing the dynamic range of an optical transmission system,
2 the optical transmission system including a RF transmitter for transmitting digital signals,
3 an RF receiver for receiving the digital signals, and an optical link operatively connecting
4 the RF transmitter to the RF receiver, the apparatus comprising:

an RF sensor adapted to measure the power level of RF digital signals to
be transmitted by the RF transmitter, the RF sensor having a sensor output
corresponding to said power level;

8 a first RF attenuator operatively coupled to the RF sensor and adapted to
9 attenuate the RF digital signals prior to being transmitted by the RF transmitter,
10 wherein the attenuation performed by the first RF attenuator corresponds to the
11 sensor output.

1 11. The apparatus of claim 10, wherein the sensor output is adapted to be transmitted to
2 the RF receiver.

12. The apparatus of claim 11, further comprising a second RF amplifier operatively coupled to the RF receiver, and adapted to amplify the digital signals, wherein the amplification performed by the second RF amplifier corresponds to the sensor output.

1 13. The apparatus of claim 12, further comprising a second RF amplifier operatively
2 coupled to the RF receiver, wherein during operation of the apparatus the magnitude of

3 the amplification performed by the second RF amplifier is approximately the same as the
4 magnitude of the attenuation performed by the first RF attenuator.

1 14. The apparatus of claim 10, further comprising a first RF amplifier operatively
2 coupled to the RF sensor and adapted to amplify the RF digital electrical signals prior to
3 being transmitted by the RF transmitter, wherein the amplification performed by the first
4 RF varies inversely with the sensor output.

1 15. The apparatus of claim 14, wherein the sensor output is transmitted to the RF
2 receiver, and further comprising a second RF attenuator operatively coupled to the RF
3 receiver, and adapted to attenuate the received digital signals, wherein the attenuation
4 performed by the second RF attenuator varies inversely with the sensor output.

1 16. The apparatus of claim 14, further comprising a second RF attenuator operatively
2 coupled to the RF receiver, wherein during operation of the apparatus the magnitude of
3 the attenuation performed by the second RF attenuator is approximately the same as the
4 magnitude of the amplification performed by the first RF attenuator.

1 17. An optical transmission system comprising:

2 an optical signal transmitter section;

3 an optical signal receiver section;

4 an optical link medium being operatively connected between the optical signal

5 transmitter section and the optical signal receiver section to form an included

6 transmission system having a dynamic range;

7 an RF stabilization system operationally connected to said transmitter section and

8 to a first conductor carrying in an RF signal having a first RF power level;

9 an RF stabilization system operationally connected to said receiver section and to

10 a second conductor carrying out the RF signal at a second RF power level;

11 wherein the RF stabilization systems operate to make the effective dynamic range

12 of the apparatus substantially wider than the dynamic range of the included transmission

13 system.

1 18. The optical transmission system of claim 17, wherein the RF stabilization systems
2 maintain the second RF power level within ± 0.5 dB of the first RF power level.

1 19. The optical transmission of claim 10, wherein the optical transmission system is a
2 cable television (CATV) system.

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- 1 26. A method for communicating radio frequency (RF) informational signals having a
- 2 RF power level, through an optical link medium, said method comprising:
- 3 providing a first conductor adapted to carry said informational signals as electrical
- 4 signals into the apparatus;
- 5 providing a RF level sensor operatively coupled to the first conductor, adapted to
- 6 measure the RF power level and to output a control signal according to said RF power
- 7 level;
- 8 providing a first RF attenuator adapted to be operatively controlled by the control
- 9 signal, and adapted to attenuate the electrical signals from the first conductor prior to
- 10 being communicated through said optical link medium;
- 11 providing a transmitter adapted to transmit the electrical signals as optical signals
- 12 into the optical link medium;
- 13 providing a receiver adapted to receive the optical signals from the optical link
- 14 medium, said receiver being operatively coupled to a second conductor adapted to output
- 15 said informational signals as electrical signals; and
- 16 outputting said electrical signals at said second conductor at ± 0.5 dB of the RF
- 17 power level.